SIEMENS

510(k) Summary

Introduction: According to the requirements of 21 CFR 807.92, the following information provides sufficient details to understand the basis for determination of substantial equivalence.

The assigned 510(k) Number: K133124

OCT 25 2013

1. **Submitter**

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Date Prepared:	October 15, 2013

2. **Device Name**

Proprietary Name:	IMMULITE® 2000 Total T3 Calibration Verification Material
Measurand:	Quality Control materials for IMMULITE® 2000 Total T3 assay
Type of Test:	Calibration Verification Material (CVM) for IMMULITE® 2000 Total T3 assay
Regulation Section:	21 CFR 862.1660, Quality Control Material
Classification:	Class I Reserved
Products Code:	JJX – Single (Specified) Analyte Controls (Assayed and Unassayed)
Panel:	Clinical Chemistry (75)

3. **Predicate Device Name** — Elecsys T3 CalCheck 5
   Predicate 510(k) No: K111552

4. **Device Description:** The Total T3 Calibration Verification Material (CVM) contains one set of four vials, 3 mL each. LT3CVM1 contains T3-free human serum matrix with preservatives. LT3CVM2, LT3CVM3 and LT3CVM4 contain low, intermediate and high levels of T3 respectively, in human serum matrix with preservatives. CVMs are supplied frozen in lyophilized form.

5. **Intended Use:** See Indications for Use Statement below

Indication for Use:	The IMMULITE® Total T3 Calibration Verification Material (CVM): For in vitro diagnostic use in the verification of calibration of the IMMULITE Total T3 assay on the IMMULITE 2000 systems
Special Conditions for Use Statement(s):	For prescription use only
Special Instrument Requirements:	IMMULITE® 2000 Systems

6. **Technological Characteristics and Substantial Equivalence Comparison with Predicate:** A comparison of the device features, intended use, and other information demonstrates that the IMMULITE® 2000 Total T3 Calibration Verification Material (CVM) is substantially equivalent to the predicate device as summarized in Table 1.

Table 1: Substantial Equivalence Comparison

SIMILARITIES		
	Candidate Device **IMMULITE 2000 Total T3 CVM**	**Predicate Device** **Elecsys T3 CalCheck 5**
Intended Use	The IMMULITE® Total T3 Calibration Verification Material (CVM) is for in vitro diagnostic use in the verification of calibration of the IMMULITE Total T3 assay on the IMMULITE 2000 systems	The Elecsys T3 CalCheck 5 is an assayed control for use in calibration verification and for use in the verification of the assay range established by the Elecsys T3 reagent on the indicated Elecsys and cobas e immunoassay analyzers.
Analyte	T3	Same
Form	Lyophilized	Same
Matrix	Human Serum	Same
Stability	Stable unopened until the expiration date	Same

DIFFERENCES		
	Candidate Device **IMMULITE 2000 Total T3 CVM**	**Predicate Device** **Elecsys T3 CalCheck 5**
Levels	4	5
Storage	-20°C	2-8°C
Use	Single Use Only	Not for Single Use

7. **Non-Clinical Performance Testing**

Performance testing has been carried out to demonstrate that this device meets the performance specifications for its intend use. The following tests were performed on the candidate device.

Stability Summary:

The stability study was conducted to validate shelf life claim for the IMMULITE 2000 Total T3 Calibration Verification Material (CVM) to ensure that it maintains optimal product performance on IMMULITE 2000 platforms throughout the established shelf life of the CVM. The Calibration Verification Materials are stable up to 5 years when stored frozen at -20°C prior to opening.

Stability Protocol Summary:
The CVM study protocols are run as part of the calibrator stability testing. The stability CVMs and reference CVMs are run in duplicate (as a minimum) and the dose value determined from the reference calibrator curve and is summarized in Table 2.

Table 2: Stability Protocol Summary

CVM Level	Time-Points (Days)			
LT3CVM1	1	1092	1456	1820
LT3CVM2	1	1092	1456	1820
LT3CVM3	1	1092	1456	1820
LT3CVM4	1	1092	1456	1820

Stability Acceptance Criteria Summary:
The Acceptance Criteria for the IMMULITE Total T3 Calibration Verification Material (CVM) are in 2 parts. Part 1 consists of the guideline acceptance criteria which require dose value of stability CVM to fall between ±12% of assigned dose for CVM level 2, ±8% of assigned dose for CVM levels 3 and ±15% for CVM level 4. Part 2 review limits criteria which require dose value of the controls to be within 2SD of the control target value when generated from the stability calibrator curve. If the result is not within acceptable dose range of ±12% for level 2 and ±8% for levels 3 and ±15% for CVM level 4 then additional data review is conducted using part 2 criteria. The acceptance criteria is summarized in Table 3.

Table 3 Acceptance criteria for stability of IMMULITE 2000 Total T3 CVM

CVM Level	Assigned Dose (ng/dL)	Guideline Criteria % difference to assigned dose	Acceptable Dose range (ng/dL)	Review Limits
LT3CVM1	0.00	not applicable	≤40.00	Controls are within 2SD of target from stability calibrator curve
LT3CVM2	101	±12	88.88 – 113.12	
LT3CVM3	215	±8	197.8 – 232.2	
LT3CVM4	610	±15	518.5 – 701.5	

Traceability:
The IMMULITE Total T3 CVMs are traceable to internal assigned reference calibrators prepared using Total T3 antigen stock solution and are traceable to internal material which is gravimetrically prepared.

Value Assignment:
The IMMULITE Total T3 CVMs are 4 level materials which are a subset of 6 level Total T3 calibrators. Calibrators are not commercialized but are used internally during manufacture and release testing of Total T3 reagents and two point adjustors. The IMMULITE calibrators and therefore CVMs are value assigned using assigned reference calibrators. The assigned reference calibrators are prepared using Total T3 antigen stock and are traceable to internal material which has been gravimetrically prepared. The CVMs are manufactured using qualified materials and measurement procedures. The CVMs dose values are generated using curve generated by assigned reference calibrators. The CVM values are calculated based on the recovered values for each run on each instrument independently. CVM values are then averaged across all systems. Quality control is performed by calculating the recovery of patient samples, spiked patient samples and controls using the assigned CVM values. The controls must fall within their target ranges. Two tri-level commercially available controls, and 25 patient samples (5 normal patients samples and 20 patient panel samples) are used to validate CVM value assignments.

Expected Values/Target Values/Reference Range:
Each CVM level was tested for a total of 27 replicates; 9 runs and 3 replicates per run, 6 different reagent kit lots and 8 IMMULITE 2000 systems. The Guideline Range (95% confidence interval) for each CVM level was established based on the Target Mean and ± 2 Standard Deviation (SD). The target values are provided in the IMMULITE® 2000 CVM Calibration verification Material lot-specific value card. The expected assay range is 40-600 ng/dL. The target values in Table 4 can be considered as guidelines.

Table 4: Analyte Target Range Values

Analyte target levels	**CVM Level**	**Target Mean (ng/dL)**	**SD**	**Guideline ±2SD Range (ng/dL)**	
	LT3CVM1	0.00	-	0.00	≤40.00
	LT3CVM2	99.0	5.975	87.1	111
	LT3CVM3	201	14	173	229
	LT3CVM4	603	45	513	693
Assay Range	40 -600 ng/dL				

Each laboratory should establish their limits for acceptability based on methodology, clinical significance and medical decision levels of the test analyte. The representative, total precision tabulated in the respective assay instructions for use may be considered as one factor when establishing local, acceptable ranges. The values provided above may be considered as guidelines. Value assignment is lot specific.

Standard/Guidance Documents Referenced:
- CEN 13640 Stability Testing of In Vitro Diagnostic Reagents
- Guidance for Industry – Abbreviated 510(k) Submissions for In Vitro Diagnostic Calibrators
- Guidance for Industry and FDA Staff – Assayed and Unassayed Quality Control Material

Proposed Labeling:
The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10

9. Conclusion:

The IMMULITE® 2000 Total T3 Calibration Verification Material is substantially equivalent to other products in commercial distribution intended for similar use. Most notably, it is substantially equivalent to the currently Elecsys T3 CalCheck 5. The substantial equivalence of the device is supported by the non-clinical testing and was found to be comparable and supports the claims of substantial equivalence, product safety and effectiveness. Based on the testing completed and the comparisons with predicate device, the IMMULITE® 2000 Total T3 Calibration Verification Material does not raise any new questions on safety and effectiveness and the results support a determination of substantial equivalence.

510(k) Summary

Introduction: According to the requirements of 21 CFR 807.92, the following information provides sufficient details to understand the basis for determination of substantial equivalence.

The assigned 510(k) Number: K133124

1. **Submitter**

Mailing Address:	Siemens Healthcare Diagnostics Inc. 511 Benedict Avenue Tarrytown, NY 10591
Contact Person:	Garo Mimaryan, MS, RAC Technical Regulatory Affairs Specialist III
Phone Number:	(914)-524-3270
Fax Number:	(914)-524-2101
E-mail Address:	garo.mimaryan@siemens.com
Date Prepared:	October 15, 2013

2. **Device Name**

Proprietary Name:	IMMULITE® 2000 Total T4 Calibration Verification Material
Measurand:	Quality Control materials for IMMULITE® 2000 Total T4 assay
Type of Test:	Calibration Verification Material (CVM) for IMMULITE® 2000 Total T4 assay
Regulation Section:	21 CFR 862.1660, Quality Control Material
Classification:	Class I Reserved
Products Code:	JJX – Single (Specified) Analyte Controls (Assayed and Unassayed)
Panel:	Clinical Chemistry (75)

3. **Predicate Device Name**

Predicate 510(k) No:	Elecsys T4 CalCheck 5 K112528

4. **Device Description:** IMMULITE® 2000 Total T4 Calibration Verification Material (CVM) contains one set of four vials, 3 mL each. LT4CVM1 contains T4-free human serum matrix with preservatives. LT4CVM2, LT4CVM3 and LT4CVM4 contain low, intermediate and high levels of T4 respectively, in human serum matrix with preservatives. CVMs are supplied frozen in lyophilized form.

5. **Intended Use:**

Indication for Use:	See Indications for Use Statement below The IMMULITE® Total T4 Calibration Verification Material (CVM) is for in vitro diagnostic use in the verification of calibration of the IMMULITE Total T4 assay on the IMMULITE 2000 systems
Special Conditions for Use Statement(s):	For prescription use only
Special Instrument Requirements:	IMMULITE® 2000 Systems

6. **Technological Characteristics and Substantial Equivalence Comparison with Predicate:** A comparison of the device features, intended use, and other information demonstrates that the IMMULITE® 2000 Total T4 Calibration Verification Material (CVM) is substantially equivalent to the predicate device as summarized in Table 1.

Table 1: Substantial Equivalence Comparison

SIMILARITIES		
	Candidate Device **IMMULITE 2000 Total T4 CVM**	**Predicate Device** **Elecsys T4 CalCheck 5**
Intended Use	The IMMULITE®Total T4 Calibration Verification Material (CVM) is for in vitro diagnostic use in the verification of calibration of the IMMULITE Total T4 assay on the IMMULITE 2000 systems	The Elecsys T4 CalCheck 5 is an assayed control for use in calibration verification and for use in the verification of the assay range established by the Elecsys T4 reagent on the indicated Elecsys and cobas e immunoassay analyzers
Analyte	T4	Same
Form	Lyophilized	Same
Matrix	Human Serum	Same
Stability	Stable unopened until the expiration date	Same

DIFFERENCES		
	Candidate Device **IMMULITE 2000 Total T4 CVM**	**Predicate Device** **Elecsys T4 CalCheck 5**
Levels	4	5
Storage	-20°C	2-8°C
Use	Single Use Only	Not for Single Use

7. **Non-Clinical Performance Testing**

Performance testing has been carried out to demonstrate that this device meets the performance specifications for its intend use. The following tests were performed on the candidate device.

Stability Summary:

The stability study was conducted to validate shelf life claim for the IMMULITE 2000 Total T4 Calibration Verification Material (CVM) to ensure that it maintains optimal product performance on IMMULITE 2000 platforms throughout the established shelf life of the CVM. The Calibration Verification Materials are stable up to 3.5 years when stored frozen at -20°C prior to opening.

Stability Protocol Summary:
The CVMs are run as part of the calibrator stability testing. The stability CVMs and reference CVMs are run in duplicate (as a minimum) and the dose value determined from reference calibrator curve and is summarized in Table 2.

Table 2: Stability Protocol Summary

CVM Level	Time-Points (Days)			
LT4CVM1	1	910	1092	1274
LT4CVM2	1	910	1092	1274
LT4CVM3	1	910	1092	1274
LT4CVM4	1	910	1092	1274

Stability Acceptance Criteria Summary:
The Acceptance Criteria for the IMMULITE Total T4 Calibration Verification Material (CVM) are in 2 parts. Part 1 consists of the guideline acceptance criteria which require dose value of stability CVM to fall between ±10% of assigned dose. Part 2 review limits criteria which require dose value of the controls to be within 2SD of the control target value when generated from the stability calibrator curve. If the result is not within acceptable dose range of ±10% then additional data review is conducted using part 2 criteria. The acceptance criteria is summarized in Table 3.

Table 3 Acceptance criteria for stability of IMMULITE 2000 Total T4 CVM

CVM Level	Assigned Dose (µg/dL)	Guideline Criteria % difference to assigned dose	Acceptable Dose range (µg/dL)	Review Limits
LT4CVM1	0.00	not applicable	≤1.00	Controls are within 2SD of target from stability calibrator curve
LT4CVM2	3.82	±10	3.44 – 4.20	
LT4CVM3	15.80	±10	14.22 – 17.38	
LT4CVM4	25.00	±10	22.50 – 27.50	

Traceability:
The IMMULITE Total T4 CVMs are traceable to internal assigned reference calibrators prepared using Total T4 antigen stock solution and are traceable to internal material which is gravimetrically prepared.

Value Assignment:

The IMMULITE® 2000 Total T4 CVMs are 4 level materials which are a subset of 6 level Total T4 calibrators. Calibrators are not commercialized but are used internally during manufacture and release testing of Total T4 reagents and two point adjustors. The IMMULITE calibrators and therefore CVMs are value assigned using assigned reference calibrators. The assigned reference calibrators are prepared using Total T4 antigen stock and are traceable to an internal material which has been gravimetrically prepared. The CVMs are manufactured using qualified materials and measurement procedures. The CVMs dose values are generated using curve generated by assigned reference calibrators. The CVM values are calculated based on the recovered values for each run on each instrument independently. The CVM values are then averaged across all systems. Quality control is performed by calculating the recovery of patient samples and controls using the assigned CVM values. The controls must fall within their target ranges. Two tri-level commercially available controls, and 25 patient samples (5 normal patients samples and 20 patient panel samples) are used to validate CVM value assignments. Quality control is performed by calculating the recovery of patient samples, spiked patient samples and controls using the assigned CVM values. The controls must fall within their target ranges

Expected Values/Target Values/Reference Range:
The CVMs are manufactured using qualified materials and measurement procedures. The TOTAL T4 CVMs were tested on 27 replicates in total comprised of 9 runs, 7 IMMULITE 2000 systems and 6 different reagent kit lots. The CVMs dose values are generated using curve generated by assigned reference calibrators. The CVM values are calculated based on the recovered values for each run on each instrument independently. The CVM values are then averaged across all systems. Quality control is performed by calculating the recovery of patient samples and controls using the assigned CVM values. The Guideline Range (95% confidence interval) for each CVM level was established based on the Target Mean and ± 2 Standard Deviation (SD). The expected assay range is 1.0 -24 µg/dL. The target values in Table 4 can be considered as guidelines.

Table 4: Analyte Target Range Levels

Analyte target levels	**CVM Level**	**Target Mean (µg/dL)**	**SD**	**Guideline ±2SD Range (µg/dL)**	
	LT4CVM1	0.00	-	0.00	≤1.00
	LT4CVM2	3.87	0.33	3.21	4.53
	LT4CVM3	16.0	0.95	14.1	17.9
	LT4CVM4	25.0	1.375	22.3	27.8
Assay Range	1.0 -24 µg/dL				

Each laboratory should establish their limits for acceptability based on methodology, clinical significance and medical decision levels of the test analyte. The representative, total precision tabulated in the respective assay instructions for use may be considered as one factor when establishing local, acceptable ranges. The values provided above may be considered as guidelines. Value assignment is lot specific.

Standard/Guidance Documents Referenced:

- CEN 13640 Stability Testing of In Vitro Diagnostic Reagents
- Guidance for Industry – Abbreviated 510(k) Submissions for In Vitro Diagnostic Calibrators
- Guidance for Industry and FDA Staff – Assayed and Unassayed Quality Control Material

Proposed Labeling:
The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10

9. Conclusion:

The Total T4 Calibration Verification Material is substantially equivalent to other products in commercial distribution intended for similar use. Most notably, it is substantially equivalent to the currently marketed Elecsys T4 CalCheck 5. The substantial equivalence of the device is supported by the non-clinical testing and was found to be comparable and supports the claims of substantial equivalence, product safety and effectiveness. Based on the testing completed and the comparisons with predicate device. The IMMULITE® 2000 Total T4 Calibration Verification Material does not raise any new questions on safety and effectiveness and the results support a determination of substantial equivalence.

510(k) Summary

Introduction: According to the requirements of 21 CFR 807.92, the following information provides sufficient details to understand the basis for determination of substantial equivalence.

The assigned 510(k) Number: K133124

1. **Submitter**

Mailing Address:	Siemens Healthcare Diagnostics Inc. 511 Benedict Avenue Tarrytown, NY 10591
Contact Person:	Garo Mimaryan, MS, RAC Technical Regulatory Affairs Specialist III
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E-mail Address:	garo.mimaryan@siemens.com
Date Prepared:	October 15, 2013

2. **Device Name**

Proprietary Name:	IMMULITE® 2000 TBG Calibration Verification Material
Measurand:	Quality Control materials for IMMULITE® 2000 TBG assay
Type of Test:	Calibration Verification Material (CVM) for IMMULITE® 2000 TBG assay
Regulation Section:	21 CFR 862.1660, Quality Control Material
Classification:	Class I Reserved
Products Code:	JJX – Single (Specified) Analyte Controls (Assayed and Unassayed)
Panel:	Clinical Chemistry (75)

3. **Predicate Device Name** — ADVIA Centaur® Intact PTH Master Curve Material
   Predicate 510(k) No: K020217

4. **Device Description:** IMMULITE® 2000 TBG Calibration Verification Material (CVM) contains one set of four vials, 2.0 mL each. LTBCVM1 contains a bovine-based matrix with preservatives. LTBCVM2, LTBCVM3 and LTBCVM4 contain low, intermediate and high levels of TBG respectively, in human-based matrix with preservatives. CVMs are supplied frozen in lyophilized form.

5. **Intended Use:**

Indication for Use:	See Indications for Use Statement below The IMMULITE® TBG Calibration Verification Material (CVM) is for in vitro diagnostic use in the verification of the IMMULITE TBG assay on the IMMULITE 2000 systems
Special Conditions for Use Statement(s):	For prescription use only
Special Instrument Requirements:	IMMULITE® 2000 Systems

6. **Technological Characteristics and Substantial Equivalence Comparison with Predicate:** A comparison of the device features, intended use, and other information demonstrates that the IMMULITE® 2000 TBG Calibration Verification Material (CVM) is substantially equivalent to the predicate device, as summarized in Table 1.

Table 1: Substantial Equivalence Comparison

SIMILARITIES		
	Candidate Device **IMMULITE 2000 TBG CVM**	**Predicate Device** **ADVIA Centaur Intact PTH MCM**
Intended Use	The IMMULITE® TBG Calibration Verification Material (CVM) is for in vitro diagnostic use in the verification of calibration of the IMMULITE TBG assay on the IMMULITE 2000 systems	For in vitro diagnostic use for evaluating the ADVIA Centaur® Intact PTH assays. This material is intended to be run singly as unknown samples after a two-point calibration has been performed on the system
Form	Lyophilized	Same
Stability	Stable unopened until the expiration date	Same
Storage	-20°C	Same
Use	Single Use Only	Same

DIFFERENCES		
	Candidate Device **IMMULITE 2000 TBG CVM**	**Predicate Device** **ADVIA Centaur Intact PTH Master Curve Material (MCM)**
Analyte	TBG	Intact PTH
Levels	4	7
Matrix	Human Serum	Bovine Serum

7. **Non-Clinical Performance Testing**

Performance testing has been carried out to demonstrate that this device meets the performance specifications for its intend use. The following tests were performed on the candidate device.

Stability Summary:

The stability study was conducted to validate shelf life claim for the IMMULITE 2000 TBG Calibration Verification Material (CVM) to ensure that it maintains optimal product performance on IMMULITE 2000 platforms throughout the established shelf life of the CVM. The Calibration Verification Materials are stable up to 5 years when stored frozen at -20°C prior to opening.

Stability Protocol Summary:
The CVM study protocols are run as part of the calibrator stability testing. The stability CVMs and reference CVMs are run in duplicate (as a minimum) and the dose value determined from the reference calibrator curve and is summarized in Table 2.

Table 2: Stability Protocol Summary

CVM Level	Time-Points (Days)			
LTBCVM1	1	1456	1638	1820
LTBCVM2	1	1456	1638	1820
LTBCVM3	1	1456	1638	1820
LTBCVM4	1	1456	1638	1820

Stability Acceptance Criteria Summary:
The Acceptance Criteria for the IMMULITE TBG Calibration Verification Material (CVM) are in 2 parts. Part 1 consists of the guideline acceptance criteria which require dose value of stability CVM to fall between ±20% of assigned dose for CVM level 2, ±15% of assigned dose for CVM levels 3 and ±20% for CVM level 4. Part 2 review limits criteria which require dose value of the controls to be within 2SD of the control target value when generated from the stability calibrator curve. If the result is not within acceptable dose range of ±20% for level 2 and ±15% for levels 3 and ±20% for CVM level 4 then additional data review is conducted using part 2 criteria. The acceptance criteria is summarized in Table 3.

Table 3 Acceptance criteria for stability of IMMULITE 2000 TBG CVM

CVM Level	Assigned Dose (µg/mL)	Guideline Criteria % difference to assigned dose	Acceptable Dose range (µg/mL)	Review Limits
LTBCVM1	0.00	not applicable	≤3.50	Controls are within 2SD of target from stability calibrator curve
LTBCVM2	5.60	±20	4.48 – 6.72	
LTBCVM3	51.0	±15	43.35 – 58.65.	
LTBCVM4	99.5	±20	79.60– 119.40	

Traceability:
The IMMULITE TBG CVMs are traceable to WHO 1ST International Standard 88/638. The CVMs are manufactured using qualified materials and measurement procedures.

Value Assignment:
The IMMULITE® 2000 TBG CVMs are 4 level materials which are a subset of 7 level TBG calibrators. Calibrators are not commercialized but are used internally during manufacture and release testing of TBG reagents and two point adjustors. The IMMULITE calibrators and therefore CVMs are value assigned using assigned reference calibrators. The CVMs dose values are generated using curve generated by assigned reference calibrators. The CVM values are calculated based on the recovered values for each run on each instrument independently. CVM values are then averaged across all systems. Quality control is performed by calculating the recovery of patient samples and controls using the assigned CVM values. Two levels of commercially available controls, and 30 patient samples (5 spiked normal patients samples and 25 patient panel samples) are used to validate CVM value assignments. Quality control is performed by calculating the recovery of patient samples, spiked patient samples and controls using the assigned CVM values. The controls must fall within their target ranges

Expected Values/Target Values/Reference Range:
The TBG CVMs were tested on 15 replicates in total comprised of 5 runs and 3 replicates per run, 4 IMMULITE 2000 systems and 4 different reagent kit lots. The CVMs dose values are generated using curve generated by assigned reference calibrators. The CVM values are calculated based on the recovered values for each run on each instrument independently. CVM values are then averaged across all systems. Quality control is performed by calculating the recovery of patient samples and controls using the assigned CVM values. The Guideline Range (95% confidence interval) for each CVM level was established based on the Target Mean and ± 2 Standard Deviation (SD). The expected assay range is 3.5-80 µg/mL. The target values in Table 4 can be considered as guidelines.

Table 4: Analyte Target Range Levels

Analyte target levels	**CVM Level**	**Target Mean** µg/mL	**SD**	**Guideline ±2SD Range** (µg/mL)	
	LTBCMV1	0.00	-	0.00	≤3.50
	LTBCVM2	5.85	0.585	4.68	7.02
	LTBCVM3	49.9	3.75	42.4	57.4
	LTBCVM4	99.0	-	-	-
	(85% of LTBCVM4 + 15% of LTB1CVM1)*	84.2	8.4	67.4	101
Assay Range	3.5 -80 µg/mL				

*Note: LTBCVM4 requires dilution to ensure that the target value is within the +10% of the top of the reportable range of the assay.

Each laboratory should establish their limits for acceptability based on methodology, clinical significance and medical decision levels of the test analyte. The representative, total precision tabulated in the respective assay instructions for use may be considered as one factor when establishing local, acceptable ranges. The values provided above may be considered as guidelines. Value assignment is lot specific.

Standard/Guidance Documents Referenced:
- CEN 13640 Stability Testing of In Vitro Diagnostic Reagents
- Guidance for Industry – Abbreviated 510(k) Submissions for In Vitro Diagnostic Calibrators
- Guidance for Industry and FDA Staff – Assayed and Unassayed Quality Control Material

Proposed Labeling:
The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10

9. Conclusion:

TBG Calibration Verification Material is substantially equivalent to other products in commercial distribution intended for similar use. Most notably, it is substantially equivalent to the currently marketed ADVIA Centaur Intact PTH MCM . The substantial equivalence of the device is supported by the non-clinical testing and was found to be comparable and supports the claims of substantial equivalence, product safety and effectiveness. Based on the testing completed and the comparisons with predicate device, the IMMULITE® 2000 TBG Calibration Verification Material does not raise any new questions on safety and effectiveness and the results support a determination of substantial equivalence.

510(k) Summary

Introduction: According to the requirements of 21 CFR 807.92, the following information provides sufficient details to understand the basis for determination of substantial equivalence.

The assigned 510(k) Number: K133124

1. **Submitter**

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Contact Person:	Garo Mimaryan, MS, RAC Technical Regulatory Affairs Specialist III
Phone Number:	(914)-524-3270
Fax Number:	(914)-524-2101
E-mail Address:	garo.mimaryan@siemens.com
Date Prepared:	October 15, 2013

2. **Device Name**

Proprietary Name:	IMMULITE® 2000 FSH Calibration Verification Material
Measurand:	Quality Control materials for IMMULITE® 2000 FSH assay
Type of Test:	Calibration Verification Material (CVM) for IMMULITE® 2000 FSH assay
Regulation Section:	21 CFR 862.1660, Quality Control Material
Classification:	Class I Reserved
Products Code:	JJX – Single (Specified) Analyte Controls (Assayed and Unassayed)
Panel:	Clinical Chemistry (75)

3. **Predicate Device Name** — Elecsys FSH CalCheck
   Predicate 510(k) No: K964829

4. **Device Description:** IMMULITE® 2000 FSH Calibration Verification Material (CVM) contains one set of four vials, 3 mL each. LFSCVM1 contains a bovine serum with preservatives. LFSCVM2, LFSCVM3 and LFSCVM4, 2 mL each, contain low, intermediate and high levels of human source FSH respectively, in bovine serum matrix with preservatives. CVMs are supplied frozen in lyophilized form.

5. **Intended Use:**

Indication for Use:	See Indications for Use Statement below The IMMULITE® FSH Calibration Verification Material (CVM) is for in vitro diagnostic use in the verification of the IMMULITE FSH assay on the IMMULITE 2000 systems
Special Conditions for Use Statement(s):	For prescription use only
Special Instrument Requirements:	IMMULITE® 2000 Systems

6. Technological Characteristics and Substantial Equivalence Comparison with Predicate:

A comparison of the device features, intended use, and other information demonstrates that the IMMULITE® 2000 FSH Calibration Verification Material (CVM) is substantially equivalent to the predicate device, as summarized in Table 1.

Table 1: Substantial Equivalence Comparison

SIMILARITIES		
	Candidate Device **IMMULITE 2000 FSH CVM**	**Predicate Device** **Elecsys FSH CalCheck**
Intended Use	The IMMULITE® FSH Calibration Verification Material (CVM) is for in vitro diagnostic use in the verification of calibration of the IMMULITE FSH assay on the IMMULITE 2000 systems	For use in the verification of the calibration established by the Elecsys FSH reagent on the indicated Elecsys and cobas e immunoassay analyzers.
Analyte	FSH	Same
Form	Lyophilized	Same
Stability	Stable unopened until the expiration date	Same

DIFFERENCES		
	Candidate Device **IMMULITE 2000 FSH CVM**	**Predicate Device** **Elecsys FSH CalCheck**
Levels	4	3
Matrix	Bovine Serum	Human Serum
Storage	-20°C	2-8°C
Use	Single Use Only	Not for Single Use

7. Non-Clinical Performance Testing

Performance testing has been carried out to demonstrate that this device meets the performance specifications for its intend use. The following tests were performed on the candidate device.

Stability Summary:

The stability study was conducted to validate shelf life claim for the IMMULITE 2000 TBG Calibration Verification Material (CVM) to ensure that it maintains optimal product performance on IMMULITE 2000 platforms throughout the established shelf life of the CVM. The Calibration Verification Materials are stable up to 5 years when stored frozen at -20°C prior to opening.

Stability Protocol Summary:
The CVM study protocols are run as part of the calibrator stability testing. The stability CVMs and reference CVMs are run in duplicate (as a minimum) and the dose value determined from the reference calibrator curve and is summarized in Table 2.

Table 2: Stability Protocol Summary

CVM Level	Time-Points (Days)			
LFSCVM1	1	1460	1642	1825
LFSCVM2	1	1460	1642	1825
LFSCVM3	1	1460	1642	1825
LFSCVM4	1	1460	1642	1825

Stability Acceptance Criteria Summary:
The Acceptance Criteria for the IMMULITE FSH Calibration Verification Material (CVM) are in 2 parts. Part 1 consists of the Guideline acceptance criteria which require dose value of stability CVM to fall between ±10% of assigned dose. Part 2 review limits criteria which require dose value of the controls to be within 2SD of the control target value when generated from the stability calibrator curve. If the result is not within acceptable dose range of ±10% then additional data review is conducted using part 2 criteria. The acceptance criteria is summarized in Table 3.

Table 3 Acceptance criteria for stability of IMMULITE 2000 FSH CVM

CVM Level	Assigned Dose (mIU/mL)	Guideline Criteria % difference to assigned dose	Acceptable dose range (mIU/mL)	Review Limits
LFSCVM1	0	not applicable	≤0.10	Controls are within 2SD of target on each curve
LFSCVM2	4.64	±10	4.18 – 5.10	
LFSCVM3	96	±10	86.40 – 105.60	
LFSCVM4	174	±10	156.60 – 191.40	

Traceability:
The IMMULITE FSH CVMs are traceable to WHO 2nd IRP (78/549, interim replacement code 94/632).

Value Assignment:
The IMMULITE® 2000 FSH CVMs are 4 level materials which are a subset of 9 level FSH calibrators. Calibrators are not commercialized but are used internally during manufacture and release testing of FSH reagents and two point adjustors. The CVMs dose values are generated using curve generated by assigned reference calibrators. The CVM values are calculated based on the recovered values for each run on each instrument independently. CVM values are then averaged across all systems. Quality control is performed by calculating the recovery of patient samples and controls using the assigned CVM values. Six levels of commercially available controls, and 30 patient samples were used to validate CVM value assignments. Quality control is performed by calculating the recovery of patient samples, spiked patient samples and controls using the assigned CVM values. The controls must fall within their target ranges

Expected Values/Target Values/Reference Range:
The FSH CVMs were tested on 15 replicates in total comprised of 5 runs and 3 replicates per run, 5 IMMULITE 2000 systems and 3 different reagent kit lots. The CVMs dose values are generated using curve generated by assigned reference calibrators. The CVM values are calculated based on the recovered values for each run on each instrument independently. CVM values are then averaged across all systems. Quality control is performed by calculating the recovery of patient samples and controls using the assigned CVM values. The Guideline Range (95% confidence interval) for each CVM level was established based on the Target Mean and ± 2 Standard Deviation (SD). The expected assay range is 0.1 -170 mIU/mL. The target values in Table 4 can be considered as guidelines.

Table 4: Analyte Target Range Levels

Analyte target levels	**CVM Level**	**Target Mean** (mIU/mL)	**SD**	**Guideline ±2SD Range** (mIU/mL)	
	LFSCVM1	0.00	-	0.00	≤0.10
	LFSCVM2	4.59	0.23	4.13	5.05
	LFSCVM3	98	7.925	82.3	114
	LFSCVM4	174	14	146	202
Assay Range	0.1 -170 mIU/mL				

Each laboratory should establish their limits for acceptability based on methodology, clinical significance and medical decision levels of the test analyte. The representative, total precision tabulated in the respective assay instructions for use may be considered as one factor when establishing local, acceptable ranges. The values provided above may be considered as guidelines. Value assignment is lot specific.

Standard/Guidance Documents Referenced:

- CEN 13640 Stability Testing of In Vitro Diagnostic Reagents
- Guidance for Industry – Abbreviated 510(k) Submissions for In Vitro Diagnostic Calibrators
- Guidance for Industry and FDA Staff – Assayed and Unassayed Quality Control Material

Proposed Labeling:
The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10

9. Conclusion:

The FSH Calibration Verification Material is substantially equivalent to other products in commercial distribution intended for similar use. Most notably, it is substantially equivalent to the currently marketed Elecsys FSH CalCheck. The substantial equivalence of the device is supported by the non-clinical testing and was found to be comparable and supports the claims of substantial equivalence, product safety and effectiveness. Based on the testing completed and the comparisons with predicate device, the IMMULITE® 2000 FSH Calibration Verification Material does not raise any new questions on safety and effectiveness and the results support a determination of substantial equivalence.

510(k) Summary

Introduction: According to the requirements of 21 CFR 807.92, the following information provides sufficient details to understand the basis for determination of substantial equivalence.

The assigned 510(k) Number: K133124

1. **Submitter**

Mailing Address:	Siemens Healthcare Diagnostics Inc. 511 Benedict Avenue Tarrytown, NY 10591
Contact Person:	Garo Mimaryan, MS, RAC Technical Regulatory Affairs Specialist III
Phone Number:	(914)-524-3270
Fax Number:	(914)-524-2101
E-mail Address:	garo.mimaryan@siemens.com
Date Prepared:	October 15, 2013

2. **Device Name**

Proprietary Name:	IMMULITE® 2000 Estradiol Calibration Verification Material
Measurand:	Quality Control materials for IMMULITE® 2000 Estradiol assay
Type of Test:	Calibration Verification Material (CVM) for IMMULITE® 2000 Estradiol assay
Regulation Section:	21 CFR 862.1660, Quality Control Material
Classification:	Class I Reserved
Products Code:	JJX – Single (Specified) Analyte Controls (Assayed and Unassayed)
Panel:	Clinical Chemistry (75)

3. **Predicate Device Name**
Predicate 510(k) No: ADVIA Centaur® Enhanced Estradiol (eE2) MCM
K102904

4. **Device Description:** IMMULITE® 2000 Estradiol Calibration Verification Material (CVM) contains one set of four vials, 2 mL each. LE2CVM1 contains human serum with preservatives. LE2CVM2, LE2CVM3 and LE2CVM4 contain low, intermediate and high levels of human source Estradiol respectively, in human serum matrix with preservatives. CVMs are supplied frozen in lyophilized form.

5. **Intended Use:**

Indication for Use:	See Indications for Use Statement below The IMMULITE® Estradiol Calibration Verification Material (CVM) is for in vitro diagnostic use in the verification of the IMMULITE Estradiol assay on the IMMULITE 2000 systems
Special Conditions for Use Statement(s):	For prescription use only
Special Instrument Requirements:	IMMULITE® 2000 Systems

6. Technological Characteristics and Substantial Equivalence Comparison with Predicate:

A comparison of the device features, intended use, and other information demonstrates that the IMMULITE® 2000 Estradiol Calibration Verification Material (CVM) is substantially equivalent to the predicate device, as summarized in Table 1.

Table 1: Substantial Equivalence Comparison

SIMILARITIES		
	Candidate Device **IMMULITE 2000 Estradiol CVM**	**Predicate Device** **The ADVIA Centaur® Enhanced Estradiol (eE2) MCM**
Intended Use	The IMMULITE®Estradiol Calibration Verification Material (CVM) is for in vitro diagnostic use in the verification of calibration of the IMMULITE Estradiol assay on the IMMULITE 2000 systems	The ADVIA Centaur® Enhanced Estradiol (eE2) Master Curve Material is for in vitro diagnostic use in the verification of calibration and reportable range of the ADVIA Centaur Enhanced Estradiol assay.
Analyte	Estradiol	Same
Form	Lyophilized	Same
Matrix	Human Serum	Same
Stability	Stable unopened until the expiration date	Same
Use	Single Use Only	Same

DIFFERENCES		
	Candidate Device **IMMULITE 2000 Estradiol CVM**	**Predicate Device** **The ADVIA Centaur® Enhanced Estradiol (eE2) MCM**
Levels	4	6
Storage	-20°C	2-8°C

7. Non-Clinical Performance Testing

Performance testing has been carried out to demonstrate that this device meets the performance specifications for its intend use. The following tests were performed on the candidate device.

Stability Summary:

The stability study was conducted to validate shelf life claim for the IMMULITE 2000 Estradiol Calibration Verification Material (CVM) to ensure that it maintains optimal product performance on IMMULITE 2000 platforms throughout the established shelf life of the CVM. The Calibration Verification Materials are stable up to 5 years when stored frozen at -20°C prior to opening.

Stability Protocol Summary:
The CVM study protocols are run as part of the calibrator stability testing. The stability CVMs and reference CVMs are run in duplicate (as a minimum) and the dose value determined from the reference calibrator curve and is summarized in Table 2.

Table 2: Stability Protocol Summary

CVM Level	Time-Points (Days)			
LE2CVM1	1	1460	1642	1825
LE2CVM2	1	1460	1642	1825
LE2CVM3	1	1460	1642	1825
LE2CVM4	1	1460	1642	1825

Stability Acceptance Criteria Summary:
The Acceptance Criteria for the IMMULITE Estradiol Calibration Verification Material (CVM) are in 2 parts. Part 1 consists of the guideline acceptance criteria which require dose value of stability CVM to fall between ±14% of assigned dose for CVM level 2, ±10% of assigned dose for CVM levels 3 and ±8% for CVM level 4. Part 2 review limits criteria which require dose value of the controls to be within 2SD of the control target value when generated from the stability calibrator curve. If the result is not within acceptable dose range of ±14% for level 2 and ±10% for levels 3 and ±8% for CVM level 4 then additional data review is conducted using part 2 criteria. The acceptance criteria is summarized in Table 3.

Table 3 Acceptance criteria for stability of IMMULITE 2000 Estradiol CVM

CVM level	Assigned Dose (pg/mL)	Guideline Criteria % difference to assigned dose	Acceptable Dose range (pg//mL)	Review Limits
LE2CVM1	0.00	not applicable	≤20.00	Controls are within 2SD of target on each curve
LE2CVM2	52	±14%	44.72 – 59.28	
LE2CVM3	502	±10%	451.80 – 552.20	
LE2CVM4	2323	±8%	2137.16 – 2508.84	

Traceability:
The IMMULITE Estradiol CVMs are traceable to internal assigned reference calibrators prepared using an Estradiol antigen stock solution and are traceable to internal material which is gravimetrically prepared.

Value Assignment:
The IMMULITE Estradiol CVMs are 4 level materials which are a subset of 7 level Estradiol calibrators. Calibrators are not commercialized but are used internally during manufacture and release testing of Estradiol reagents and two point adjustors. The CVMs dose values are generated using curve generated by assigned reference calibrators. The CVM values are calculated based on the recovered values for each run on each instrument independently. CVM values are then averaged across all systems. Quality control is performed by calculating the recovery of patient samples and controls using the assigned CVM values. Four levels of commercially available controls, and 30 patient samples (5 normal patients samples and 25 spiked samples) are used to validate CVM value assignments. Quality control is performed by calculating the recovery of patient samples, spiked patient samples and controls using the assigned CVM values. The controls must fall within their target ranges

Expected Values/Target Values/Reference Range:
The FSH CVMs were tested on 15 replicates in total comprised of 5 runs and 3 replicates per run, 5 IMMULITE 2000 systems and 3 different reagent kit lots. The CVMs dose values are generated using curve generated by assigned reference calibrators. The CVM values are calculated based on the recovered values for each run on each instrument independently. CVM values are then averaged across all systems. Quality control is performed by calculating the recovery of patient samples and controls using the assigned CVM values. The Guideline Range (95% confidence interval) for each CVM level was established based on the Target Mean and ± 2 Standard Deviation (SD). The expected assay range is 20 -2000 pg/mL. The target values in Table 4 can be considered as guidelines.

Table 4: Analyte Target Range Levels

Analyte target levels	**CVM Level**	**Target Mean (pg/mL)**	**SD**	**Guideline ±2SD Range (pg/mL)**	
	LE2CVM1	0.00	-	0.00	≤20.00
	LE2CVM2	61.5	9.85	41.8	81.20
	LE2CVM3	478	33.5	411	545
	LE2CVM4	2034	142.5	1749	2319
Assay Range	20 - 2000 pg/mL				

Each laboratory should establish their limits for acceptability based on methodology, clinical significance and medical decision levels of the test analyte. The representative, total precision tabulated in the respective assay instructions for use may be considered as one factor when establishing local, acceptable ranges. The values provided above may be considered as guidelines. Value assignment is lot specific.

Standard/Guidance Documents Referenced:

- CEN 13640 Stability Testing of In Vitro Diagnostic Reagents
- Guidance for Industry – Abbreviated 510(k) Submissions for In Vitro Diagnostic Calibrators
- Guidance for Industry and FDA Staff – Assayed and Unassayed Quality Control Material

Proposed Labeling:
The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10

9. Conclusion:

The Estradiol Calibration Verification Material is substantially equivalent to other products in commercial distribution intended for similar use. Most notably, it is substantially equivalent to the currently marketed The ADVIA Centaur® Enhanced Estradiol (eE2) MCM. The substantial equivalence of the device is supported by the non-clinical testing and was found to be comparable and supports the claims of substantial equivalence, product safety and effectiveness. Based on the testing completed and the comparisons with predicate device, the IMMULITE® 2000 Estradiol Calibration Verification Material does not raise any new questions on safety and effectiveness and the results support a determination of substantial equivalence.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
10903 New Hampshire Avenue
Document Control Center - WO66-G609
Silver Spring, MD 20993-0002

October 25, 2013

SIEMENS HEALTHCARE DIAGNOSTICS INC.
c/o Garo Mimaryan
511 Benedict Ave.
TARRYTOWN NY 10591

Re: K133124
Trade/Device Name: IMMULITE® 2000 Total T3 Calibration Verification Material
IMMULITE® 2000 Total T4 Calibration Verification Material
IMMULITE® 2000 TBG Calibration Verification Material
IMMULITE® 2000 FSH Calibration Verification Material
IMMULITE® 2000 Estradiol Calibration Verification Material
Regulation Number: 21 CFR 862.1660
Regulation Name: Quality control material (assayed and unassayed)
Regulatory Class: I, reserved
Product Code: JJX
Dated: September 27, 2013
Received: September 30, 2013

Dear Garo Mimaryan:

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration. Please note: CDRH does not evaluate information related to contract liability warranties. We remind you, however, that device labeling must be truthful and not misleading.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 898. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Parts 801 and 809); medical device reporting (reporting of medical device-related adverse events) (21 CFR 803); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820); and if applicable, the

electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR 1000-1050.

If you desire specific advice for your device on our labeling regulations (21 CFR Parts 801 and 809), please contact the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638 2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21CFR Part 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm for the CDRH's Office of Surveillance and Biometrics/Division of Postmarket Surveillance.

You may obtain other general information on your responsibilities under the Act from the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm.

Sincerely yours,

Carol C. Benson -S for

Courtney H. Lias, Ph.D.
Director
Division of Chemistry and Toxicology Devices
Office of In Vitro Diagnostics
and Radiological Health
Center for Devices and Radiological Health

Enclosure

Indications for Use

510(k) Number (if known): k133124

Device Name:
IMMULITE® 2000 Total T3 Calibration Verification Material
IMMULITE® 2000 Total T4 Calibration Verification Material
IMMULITE® 2000 TBG Calibration Verification Material
IMMULITE® 2000 FSH Calibration Verification Material
IMMULITE® 2000 Estradiol Calibration Verification Material

Indications for Use:
The IMMULITE® Total T3 Calibration Verification Material (CVM) is intended for in vitro diagnostic use in the verification of calibration of the IMMULITE Total T3 assay on the IMMULITE 2000 systems.

The IMMULITE® Total T4 Calibration Verification Material (CVM) is for in vitro diagnostic use in the verification of calibration of the IMMULITE Total T4 assay on the IMMULITE 2000 systems.

The IMMULITE® TBG Calibration Verification Material (CVM) is for in vitro diagnostic use in the verification of calibration of the IMMULITE TBG assay on the IMMULITE 2000 systems.

The IMMULITE® FSH Calibration Verification Material (CVM) is for in vitro diagnostic use in the verification of calibration of the IMMULITE FSH assay on the IMMULITE 2000 systems.

The IMMULITE® Estradiol Calibration Verification Material (CVM) is for in vitro diagnostic use in the verification of calibration of the IMMULITE Estradiol assay on the IMMULITE 2000 systems.

Prescription Use ___X___ (21 CFR Part 801 Subpart D) And/Or Over the Counter Use ____. (21 CFR Part 801 Subpart C)

(PLEASE DO NOT WRITE BELOW THIS LINE; CONTINUE ON ANOTHER PAGE IF NEEDED)

Concurrence of CDRH, Office of In Vitro Diagnostics and Radiological Health (OIR)

Yung[redacted]han -S

Division Sign-Off
Office of In Vitro Diagnostics and Radiological Health
510(k) k133124